

## Climate-Weather modeling studies Using a Prototype Global Cloud-System Resolving Model

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# Project Overview:

- **Study the effect of clouds in climate-weather models:**
  - Clouds remain largest source of uncertainty in global climate models
  - Experiments to be performed with:
    - Atmospheric models
    - Coupled atmosphere, ocean, ... models
- **Experiments will focus on 2008 "Year of Tropical Convection" research program:**
  - 12 km HIRAM-hydrostatic model
  - 3.5 km HIRAM-non-hydrostatic model

*Scientific Field: Climate*

*Codes: HIRAM*

# Computational Approach:

- **Science Infrastructure:**

- Contains: atmospheric, ocean, lands, ice, chemistry, ...

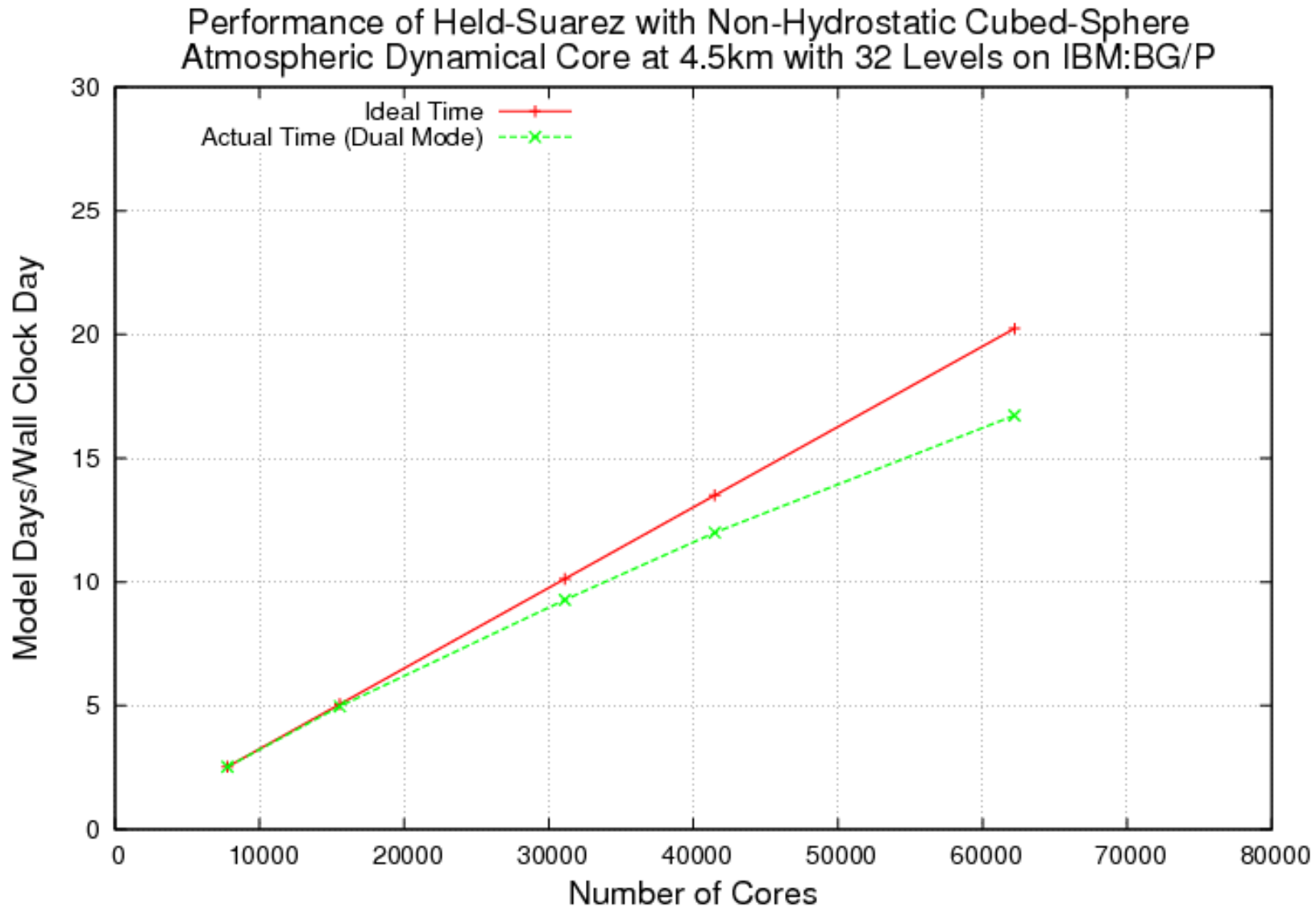
- **Model Software Infrastructure (FMS):**

- Hybrid programming model (MPI and OpenMP)
- Memory footprint
- I/O scheme

- **Workflow infrastructure (FRE):**

- Model setup and configuration
- Post-processing and analysis scripts
- Data transfer between ANL and GFDL
- Data portal at ANL

# Model Performance and Scalability:



# Software Development Plans:

- Improve MPI and OpenMP implementations
- Improve load-imbalance
- Improve I/O schemes
- Improve single core performance
- Perform detailed analysis of multiple core scaling characteristics with MPI and OpenMP

# Plans for Next 6-Months:

- **Experiments:**

- Complete 5-year experiment with 12km atmospheric model
- Begin 3-month experiment with 3.5km atmospheric model

- **Software Development:**

- Improve single and multi-core performance of the code

- **Participation:**

- 3- scientists added to the project

# Questions: